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422 Rec'd PCT/PTO 06 OCT 2000

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9-28-01

SUBSTITUTE SPECIFICATION

Our Reference: VAL-491-A

PATENT

ELECTRIC MOTOR UNIT, IN PARTICULAR FOR A MOTOR VEHICLE, INCORPORATING AN ELECTRONICS FOR CONTROL OF THE UNIT

BACKGROUND

~~This invention involves an electric motor unit and an electronic control of the motor.~~

The electric motor unit proposed by the invention can be advantageously used in a motorized fan used for the heater and/or vent and/or air conditioner of a motor vehicle.

~~Historically, the stator of such a motor unit is made up of a carbon carrying plate (PPC) which presents, first, a brass insert and, second, a radiator.~~

The brass insert serves, first, to guide the electrons and, second, to bring the current closer to the MOSFET transistor lead from the power circuit to the right of the radiator.

The radiator, generally made of aluminum, recools the power components (diodes, MOSFET transistors) and presents casings into which certain electronic components carried by a circuit imprinted with the command electronics are received and held.

A motor unit of this type was described in the French patent application of the Assignee under number 98 03 128.

The invention particularly proposes a motor unit structure that allows very high tolerances of connections between the radiator and the brass insert.

The invention also proposes a motor unit structure, the rigidity and the watertightness of which is improved.

The invention also proposes a motor unit structure in which the means of connection and the assembly of the components are simplified.

SUMMARY

~~The invention proposes an electric motor unit of a motor vehicle containing a wiper blade carrier plate that presents, first, a brass insert and second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds~~

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~~the insert and the radiator. This over molding provides make up for play between the pieces~~

~~In addition, the over molding contributes to the rigidity of the plate,~~
which allows optimization of the design of the radiator and the quantity of aluminum
used for it, by removing from the radiator the parts that are not necessary in its
recoiling and that only serve to increase the rigidity of the plate. Moreover, the over-
molding also presents a partition that separates, in a waterproof way, on the plate, the
zone designed to receive the electronic card and a wiper blade.

The area that is defined for the over molding and which receives the
card can, in addition, be closed by a lid for which the edge of the over-molding
defines a watertight plane.

The combination of the over-molding and the lid is defined by the
imprinted circuit card and the electronic components (in the cold area of the motor) a
watertight case in which the components thermically isolated in relation to the zone
that carries the brushes (electrotechnical zone - hot zone). There is also an
uncoupling between the electronic zone and the electrotechnical zone.

It can also, advantageously, be planned that on the separation partition
the means of respiration allowing circulation of the air from one zone to the other
~~without allowing the entrance of moisture in the electronic zone.~~

BRIEF DESCRIPTION OF THE DRAWING

~~Other characteristics and advantages of the invention will become~~
more clear in the following description. This description is purely illustrative and not
limiting. It must be read in regards to the attached drawings In which:

Figure 1 is a cut view schematic representation of the motor unit
conforming to one possible method of production of the invention;

Figure 2 is an exploded perspective view of a motor unit from Figure
1;

Figure 3 is a perspective schematic representation illustrating the
connection of the plate to the casing of the motor unit of Figures 1 and 2; and

Figure 4 is a detailed perspective representation of the mechanical
~~means for the blockage of the plate in relation to the casing.~~

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DESCRIPTION OF THE PREFERRED EMBODIMENT

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~~The motor unit which is illustrated in Figures 1 and 2 contains a casing~~
1, a rotational axis 2, an inductor fixed in relation to the casing, and an inductor 4
powered by the brushes 5. These brushes 5 are guided by a brass insert 6 which
presents an electronic wiper blade carrier plate (PPCE) that also contains a radiator 7.

On this radiator 7 are placed power components (diodes, MOSFET
transistors). A printed circuit card C1, which carries control components, is also
placed to the right of this radiator 7.

The PPCE plate presents a over-molding 9 which surrounds the brass
insert 6 and the radiator 7. This over-molding 9 also presents a partition 10 that
separates, in a watertight manner, on the plate, the zone that is designed to receive an
electronic card C1, from the electrotechnical zone that carries the brushes 5. The
peripheral over-molding 9 and this partition 10 define, with a lid 12, a watertight case
into which is received the electronics card C1.

The peripheral over-molding 9 and the transversal partition 10
together define a watertight plane on which is received a joint 13 that is designed to
be compressed between the lid 12 and the edge of the over-molding 9. The lid 12 is
made up of a plastic hood 12a in which is placed a metallic-plated hood 12b.

The printed circuit card C1 is double-sided, the components reaching
from one side of the card to the other.

It is foreseen that the over-molding 9 casings allow the positioning and
holding of the components before soldering the components onto the card.

The power and control current is led to the electronic components
(control components of the printed circuit card and power components (MOSFET,
diodes) mounted on the radiator 7) by the stripe that presents the brass insert 6. The
brass insert 6 is directly soldered to the printed circuit card or to the power
components. One removes, as a consequence, a connection level between the printed
circuit card C1 and the brass insert 6. The links between the brass insert 6 and the
card C1 are thus optimized, which allows the considerable reduction of heating of the
surface of the electronic card.

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~~The power components like the MOSFET transistor and the diodes are~~
cooled by the aluminum radiator 7, which is fitted with blades placed in the external
air flux.

5 The radiator 7, the plastic over-molding 9, and the lid are assembled in
such a manner to make up a watertight case 1 vis-à-vis the exterior, but also from the
interior of the motor (thermal protection, protection from dust, protection from
electromagnetic rays, etc.)

10 The means allowing the removal of condensation produced by the
radiator 7 in the case 1 defined by the over-molding 9 and the lid 12 are
advantageously foreseen by the watertight partition 10. Also, the over-molding 9
presents the means for the passage of the wires designed to power the brass insert 17.
Particularly, the over-molding 9 contains means allowing the implantation of a
connecting module designed to power the brass insert 6 and the electronic controls
and allows the connection towards the exterior by a complimentary connector.

15 The electrotechnical part is closed by a flask F.

As one can see in Figures 2 to 4, the over-molding 9 of the plate
presents elastic attachment flaps 14 designed to work with complimentary forms 15
can come from the stamping that presents the case 1, in order to stabilize the plate in
relation to the case 1.

20 One will note that one solution for attachment is particularly
economical; typically, the means of attaching the plate on the case 1 are made up of
rolled-stapled sheet metal.

The elastic leads 14 and the complimentary forms 15 that present the
case 1 are, for example, restarted in such a way to create a limitation imposing a
25 single possible position relative between the plate and the case 1. For example, the
leads 14 and the forms 15 are angularly spaced, respectively, two by two at 115°,
115°, 130°.

30 As is illustrated on Figure 4, the elastic leads 14 end, for example, at
beveled protuberances 16 that facilitate the connection of the plate onto the case 1
and assure, during of the connection, the mechanical stabilization of the ensemble by

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~~avoiding the lowering of the plate under the counterweight of the electronics~~
~~incorporated into the motor.~~

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Specifications

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1. Electric motor unit of a motor vehicle containing a wiper blade carrier plate, that presents, first, a brass insert and, second, a radiator, characterized by the plate presenting a plastic over-molding that surrounds the insert and the radiator.
2. Motor unit according to specification 1, characterized by the over-molding presenting a partition which, on the plate, separates in a watertight manner, a zone designed to receive the electronic card from the wiper blade zone.
3. Motor unit according to specification 2, characterized by containing, in addition, a lid designed to close the zone that is delineated by the peripheral over-molding and the partition and which receives the electronic card; the edge of the over-molding defining a watertight plane for the lid.
4. Motor unit according to specification 3, characterized by the separating partition containing the means to allow removal of condensation in the said zone.
5. Motor unit according to one of the preceding specifications, characterized by the brass insert being directly soldered to the printed circuit card and to the power components.
6. Motor unit according to one of the preceding specifications, characterized by the over-molding presenting casings designed to receive the electronic card, the components of this card, and/or the components of the plate.
7. Motor unit according to one of the preceding specification, characterized by the over-molding presenting elastic attachment leads designed to work with complimentary forms that present the case.
8. Motor unit according to specification 7, characterized by the elastic leads and the complimentary forms being started again in such a way as to limit the relative position of the plate and the case.
9. Motor unit according to one of the preceding specifications, characterized by the over-molding having the means for the passage of wires designed to power the brass insert.
10. Motor unit according to specification 9, characterized by the over-molding containing the means of allowing implantation of a connecting module

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designed to power the insert and the electronic controls and allowing the connection towards the exterior by a complimentary connector.

11. Electric motor unit for a motorized fan group used in the heater and/or fan and/or air conditioning of a motor vehicle, characterized by being made up of a
- 5 motor unit according to one of the preceding specifications.

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